

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
25 November 2004 (25.11.2004)

PCT

(10) International Publication Number  
**WO 2004/101653 A3**

(51) International Patent Classification<sup>7</sup>: C08J 3/22, C08L 83/04, 83/06, 83/08, 101/00

(21) International Application Number:  
PCT/EP2004/050327

(22) International Filing Date: 18 March 2004 (18.03.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
103 21 555.7 14 May 2003 (14.05.2003) DE

(71) Applicant (for all designated States except US): DE-GUSSA AG [DE/DE]; Bennigsenplatz 1, 40474 Düsseldorf (DE).

(72) Inventors; and

(75) Inventors/Applicants (for US only): KÜHNLE, Adolf [DE/DE]; Greifenberger Strasse 30, 45770 Marl (DE). JOST, Carsten [DE/DE]; Bebelstrasse 14 a, 45770 Marl (DE).

(74) Common Representative: DEGUSSA AG; Intellectual Property Management, PATENTS + TRADEMARKS, Bau 1042 - PB 15, 45764 Marl (DE).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM,

AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

**Published:**

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

(88) Date of publication of the international search report:  
20 January 2005

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: TRANSPARENT MASTERBATCHES FOR THERMOPLASTICS

(57) Abstract: The invention relates to a transparent masterbatch for improving the surface properties of thermoplastics, said masterbatch containing from 10% to 60% by weight of polyhedral oligomeric silicon-oxygen cluster units in accordance with the formula  $[(R_aX_bSiO_{1.5})_m(R_cX_dSiO)_n(R_eX_fSi_2O_{2.5})_o(R_gX_hSi_2O_2)_p]$  where: a, b, c = 0-1; d = 1-2; e, f, g = 0-3; h = 1-4; m+n+o+p ≥ 4; a+b = 1; c+d = 2; e+f = 3 and g+h = 4; R = hydrogen atom, alkyl, cycloalkyl, alkenyl, cycloalkenyl, alkynyl, cycloalkynyl group or polymer unit, each substituted or unsubstituted, or further functionalized polyhedral oligomeric silicon-oxygen cluster units attached via a polymer unit or a bridging unit, X = oxy, hydroxy, alkoxy, carboxy, silyl, alkylsilyl, alkoxy-silyl, siloxy, alkylsiloxy, alkoxy-siloxy, silylalkyl, alkoxy-silylalkyl, alkylsilylalkyl, halogen, epoxy, ester, fluoroalkyl, isocyanate, blocked isocyanate, acrylate, methacrylate, nitrile, amino, phosphine or polyether group or substituents of type R containing at least one such group of type X the substituents of type R being identical or different and the substituents of type X being identical or different and from 40% to 90% by weight of a thermoplastic carrier material, and to a transparent thermoplastic and to its production process.

WO 2004/101653 A3

# INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP2004/050327

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 C08J3/22 C08L83/04 C08L83/06 C08L83/08 C08L101/00

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C08L C08J

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2001/018486 A1 (LICHTENHAN ET AL) 30 August 2001 (2001-08-30) *page 3, claims 1,8*	1-12
X	US 2003/018109 A1 (HSIAO ET AL) 23 January 2003 (2003-01-23) p.3claim 1	1-12
X,P	WO 03/042292 A (CREAVIS) 22 May 2003 (2003-05-22) claims 2,12,15,27	1-12
X	US 2003/050408 A1 (PUHALA ET AL) 13 March 2003 (2003-03-13) claim 1	4
-/-		

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

### \* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the International filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the International filing date but later than the priority date claimed

"T" later document published after the International filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the International search

11 November 2004

Date of mailing of the International search report

22/11/2004

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3016

Authorized officer

Lentz, J.C.

# INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP2004/050327

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>LICHTENHAN ET AL: "Thermoplastic hybrid materials etc."  MAT.RES.SOC.SYMP.PROC., MATERIALS RESEARCH SOCIETY,  vol. 435, 1996, pages 3-11, XP008014654  *see abstract +introduction*</p>	1-12
A	<p>HADDAD ET AL: "Hybrid organic-inorganic thermoplastics: etc."  MACROMOLECULES,  vol. 29, 1996, pages 7302-7304,  XP000629343  *see whole doc.*</p>	1-12

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/EP2004/050327

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 2001018486	A1	30-08-2001	NONE	
US 2003018109	A1	23-01-2003	NONE	
WO 03042292	A	22-05-2003	DE 10249563 A1 WO 03042292 A2	28-05-2003 22-05-2003
US 2003050408	A1	13-03-2003	EP 1310521 A1	14-05-2003